

SIGNIFICANT FIGURES

(P1) (3 MARKS)

1 — 9 ✓
0 ?

✓✓✓✓✓
12345 (5sf)
✓✓✓✓✓
45.6789 (6sf)

RULE 1:

✓✓xxx
12000 (2sf)
→

xxx✓✓✓
0.000513 (3sf)
→

START MOVING FROM DECIMAL
TOWARDS THE NUMBERS.

UNTIL YOU REACH A NUMBER
NO ZERO IS SIGNIFICANT.

ONLY USE RULE 1 ON THE
NUMBERS WHICH ARE
ONE-SIDED.

MEANING WHOLE NO IS ON
ONE SIDE OF DECIMAL.

eg 123000
0.000123

RULE 2:

TRAPPED ZERO
IS SIGNIFICANT

✓✓✓
102 (3sf)
T

✓✓✓xxx
1204000 (4sf)
T →

✓✓✓✓✓✓
13050.09 (7sf)
T T

RULE 3:

AN UNNECESSARY
ZERO IS SIGNIFICANT

UNNECESSARY ZERO:
1) After the decimal
2) Extreme Right side

✓✓✓
12.0 (3sf)
un

xxx✓✓✓
0.0005600 (4sf)
→ un

✓✓✓✓✓✓
120300.0 (7sf)
T T un

HOW TO CONVERT TO GIVEN SIGNIFICANT FIGURES:-

Q: Convert these to 2 significant figures:

(a) $\underline{12345}$ round off $\rightarrow 12000$ Remove ONLY UNNECESSARY ZERO. $\rightarrow 12000$

(b) $\underline{356.714}$ round off $\rightarrow 360.000$ Remove ONLY UNNECESSARY ZERO. $\rightarrow 360$

(c) $0.00\underline{579621}$ round off $\rightarrow 0.00580000$ Remove ONLY UNNECESSARY ZERO. $\rightarrow 0.0058$

(d) $\underline{12340.08}$ round off $\rightarrow 12000.00$ Remove ONLY UNNECESSARY ZERO. $\rightarrow 12000$

(e) $\underline{7.98}$ $\rightarrow 8.00$ $\rightarrow 8.0$

ESTIMATION

P1

Goal is to estimate in such a way that your calculations become simple to solve without a calculator.

TYPE 1

Round off to nearest whole number, ten or hundred.

$$9.8 \rightarrow 10$$

$$168 \rightarrow 170$$

$$385 \rightarrow 400$$

TYPE 2

a) $\frac{29}{4} \approx \frac{28}{4} = 7$

In case of division try to get to

b) $\frac{72}{\pi} = \frac{72}{3.142} = \frac{72}{3} = 24$

closest multiple

TYPE 3

a) $\sqrt{11} = \sqrt{9} = 3$

Jump to the

closest square (b) $\sqrt{50} = \sqrt{49} = 7$

or cube

numbers

(c) $\sqrt{30} = \sqrt{25} = 5$

Past paper Question:

Estimate

$$\sqrt{\frac{72}{\pi}} = \sqrt{\frac{72}{3}} = \sqrt{24} \approx \sqrt{25} = 5$$

By writing each number correct to 1 significant figure, estimate the value of

$8.62 \rightarrow 9.00 \rightarrow 9$

$\uparrow$
+1

$2.04 \rightarrow 2.00 \rightarrow 2$

$\uparrow$
+0

$0.285 \rightarrow 0.300 \rightarrow 0.3$

$\uparrow$
+1

$$\frac{8.62 \times 2.04^2}{0.285}$$

$$\frac{9 \times 2^2}{0.3} = \frac{36.0}{0.3} = \frac{360}{3} = 120$$

Answer[2]

By writing each number correct to 1 significant figure, estimate the value of

$$48.9 \rightarrow 50.0 \rightarrow 50$$

$$0.207 \rightarrow 0.200 \rightarrow 0.2$$

$$3.94 \rightarrow 4.00 \rightarrow 4$$

$$\frac{48.9 \times 0.207^2}{3.94}$$

$$\frac{50 \times 0.2^2}{4}$$

$$\frac{50 \times 0.04}{4}$$

$$0.5$$

$$0.2^2 = 0.2 \times 0.2$$

$$= 0.04$$

Answer [2]

(a) Estimate, correct to the nearest whole number, the value of $\sqrt{\frac{72.187}{\pi}}$.

Show clearly the approximate values you use.

$$\begin{aligned} \sqrt{\frac{72}{3}} &= \sqrt{24} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

Answer [1]

(b) Estimate the value of $\sqrt{200}$, giving your answer correct to two significant figures.

$$\begin{array}{cc} 196 & 225 \\ \sqrt{196} & = 14 \end{array}$$

Answer [1]